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ABSTRACT

The primary purpose of this study was to develop a model plan for granting college credit for trade and industrial occupational experience. A review of the literature indicated that several schools were granting credit for occupational experience but few had developed standard procedures. Teacher educators, state department officials, and instructors in vocational technical schools were contacted for pertinent information. Relevant materials were identified and, in some cases, purchased for use in the future development of the project. However, institutions which had developed tests were reluctant to provide copies and some stated their tests needed revision. It was therefore concluded that tests had to be developed and that impartial methods for granting credit had to be devised. The following steps were followed in the development of a model plan: (1) Establish occupational areas to be included, (2) Subdivide into specialized areas, (3) Analyze content of specialized areas for knowledge and skills needed by the instructor, (4) List competencies and evaluate listing, (5) Review evaluated list and formulate a final list, (6) Develop a system by which an applicant would receive fair evaluation and justifiable credit for occupational experience. (JK)

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KEARNEY STATE COLLEGE

DEPARTMENT OF INDUSTRIAL EDUCATION

SCHOOL OF BUSINESS AND TECHNOLOGY

Final Report

of

Summer Research Project

PRELIMINARY RESEARCH AND DEVELOPMENT OF A MODEL OCCUPATIONAL TEACHER EDUCATION PROGRAM

James A. Miller

August 15, 1969

Sponsored by:

NEBRASKA RESEARCH COORDINATING UNIT FOR VOCATIONAL EDUCATION

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ABSTRACT

Preliminary Research and Development of a Model Vocational Teacher Education Program

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Kearney State College, Kearney, Nebraska. Nebraska Research Coordinating Unit.

August 15, 1969

*Vocational Teacher Education, *College Credit for Work Experience, *Technical Competencies, *Competency Testing.

Nebraska

The purpose of this study was to develop a model plan for granting college-university credit for trade and industrial occupational experience. Selection and/or preliminary development of competency tests was of prime importance, and the development of a method for the identification of the competencies needed by instructors in specific occupational areas was given special consideration.

A review of the literature was made, and it was found that there are several schools which are presently granting college-university credit for occupaticnal work experience. Very few of these schools, however, have developed a standard format or methods and procedures by which they evaluate a student's work experience. The criteria by which they arrive at a set number of hours toward

a degree is quite flexible.

The procedure used to gather information pertinent to the project was to interview and/or correspond with teacher educators, state department officials, and instructors in vocational-technical schools.

Recommendations reflect the need for further development of valid competency examinations and the need for a central organization which could consider these examinations.

FOREWORD

As has been the case in several other midwestern states in the past decade, Nebraska has experienced a change from a predominantly agricultural population to one which now has a resident population of over 516,000 people employed in occupations which are classified as non-agricultural. The need for additional qualified people in non-agricultural occupations, and especially in occupations related to the areas of trade and industry, is growing at an ever accelerating pace. (Nebraska RCU for Voc-Ed, Occupational Opportunities in Nebraska, 1968).

In order to supply qualified workers in the occupational areas, an expanded program for the training of qualified teachers must be initiated. The School of Business and Technology at Kearney State College is presently faced with the many problems involved with the initiation of such a program. This project, conducted by Kearney State College and the State of Nebraska, was designed to help alleviate some of these problems. Special emphasis was given to the development of a model plan for granting college-university credit for occupational work experience. The secondary concern was to produce a systematic procedure for the development of competency measurement for the various areas of occupational education.

This study is the direct result of a Discretionary Award from the Nebraska Research Coordinating Unit. A special note of appreciation should be made to all who have assisted, either directly or indirectly, in the development of this project. Included are the members of the Kearney State College Industrial Education Department, industrial teacher

educators across the country, state department vocational education directors, the staff members of the Nebraska vocational-technical schools, leaders of local industries, and the staff of the Nebraska Research Coordinating Unit. Without the cooperation, personal opinions, and technical information provided by these people, the information in this report would not have been compiled.

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PART I INTRODUCTION

Need for the Study

Objectives of the Study

Scope and Limitations of the Study

Definition of Terms

NEED FOR THE STUDY

There has long been a need for new and improved programs for the preparation of trade and industrial teachers. This need is quite well documented by the words of Grant Venn. (Venn, 1964:151-153).

> One of the greatest handicaps to the improvement and expansion of vocational and technical education is the desperate shortage of qualified teachers and administrators.
>
> Ultimately, vocational and technical education will be as good as those who teach it, and the preparation and continued updating of teachers for it must become the responsibility of the colleges and universities with experience in teacher education and schools and departments in the relevant disciplines. Such teacher preparation programs may involve some new relationships between the institution of higher education and business and industry. It will mean that qualified students will have to be recruited. It will involve a considerable amount of new research into the nature of occupational education and the world of work since, partly because of higher education's neglect, the literature of vocational and technical education is meager and often vapid.
>
> Not all institutions of higher education should undertake programs of vocational and technical education. But many additional colleges and universities must provide the particular services they are qualified to give to this form of instruction. For large numbers of these institutions, the principal service will be a massive effort in the preparation and continuing education of teachers for vocational and technical education.

When these words were written in 1964, this need for technically trained people and, consequently, more and better trained trade and industrial teachers had only begun to be felt.

A more recent acknowledgment of this need is identified in the current Nebraska State Plan of Vocational Education.

> The characteristics of Nebraska's labor force in the 1970's have included the recognition that rapid technological changes both in the urban and rural sectors are creating new demands for human resource development. This would indicate that many more occupationally trained, skilled persons need to be trained in both secondary and post secondary programs. Past records

indicate more than five job opportunities are available for each graduate from post secondary vocational-technical schools.

Many such statements and reports have prompted the Kearney State College School of Business and Technology to plan for the preparation of teachers to staff the programs which will most surely be needed in the near future in the State of Nebraska. A program terminating with a Bachelor of Science degree in Occupational Education has been accepted by the State Board of Education and will be initiated during the 1969-1970 academic year. The unique part of this program is that it offers skilled craftsmen a chance to acquire college credit for occupational experience.

In order to evaluate occupational experience and to grant college-university credit, a complete analysis of the technical competencies required of instructors in the various areas of occupational education needs to be conducted. Based upon this analysis, tests of various forms will need to be constructed. The development of a systematic procedure is mandatory to evaluate fairly each individual's technical competencies and work experience and to grant college-university credit uniformly and justifiably. These are the primary needs for this study.

OBJECTIVES OF THE STUDY

The major objective of this study is to lay the ground work for development of a model plan which will enable qualified students in the area of occupational education to receive college-university credit for work experience. This is an area of the college curriculum which has long been neglected by most institutions of higher learning. It is an area which must be analyzed with great care and one which must not be abused. If credit of this type is to be given, it must be done with reference to established policies and procedures.

The specific objectives of this study are to:

1. Review the literature which is pertinent to the development of a plan for granting college-university credit for work experience and to determine the present practices of other institutions already involved in this type of program.

2. Develop a model plan for granting college-university credit for trade and industrial experience.

3. Establish the various occupational areas to be included in the model plan.

4. Sub-divide the occupational area of metalworking into specialized areas.

5. Conduct an analysis of the content of each specialized area of metalworking to determine the knowledge and skills needed to function as a competent T and I instructor.

6. Compile a list of technical competencies needed by a T and I instructor in the specialized areas of metalworking.

7. Develop a method for evaluating identified technical competencies in the specialized areas of metalworking.

8. Review and revise the evaluated list of technical competencies in the specialized area of metalworking and formulate a final list.

9. Develop a model test for a specialized area of metalworking, based upon the established technical competencies.

10. Formulate rationale for submitting a possible proposal for extensive development of the model plan, requesting funding.

SCOPE AND LIMITATIONS OF THE STUDY

This project was designed to analyze the research which had been conducted in the area of granting college-university credit for occupational experience. The prime objectives were to draw all research findings together and prepare a model plan for identifying technical competencies needed by occupational instructors and to develop a means of evaluating these competencies. This model plan would then be submitted in proposal form for the further development of the identified occupational areas of trade-industrial education.

DEFINITION OF TERMS

MODEL PLAN

A plan for the granting of college-university credit for trade and industrial occupational experience in the State of Nebraska

MODEL TEST

A test designed to act as a guide or format in preparing tests for other areas

OCCUPATIONAL AREAS

Areas of trade and industrial education, established by this study to fit the organization of the Industrial Education Department at Kearney State College and its new Bachelor of Science program in Occupational Education:

a. Building Trades and Woodworking
b. Drafting
c. Electricity-Electronics
d. Graphic Arts
e. Metalworking
f. Power

RECOGNIZED SCHOOL

Any school; such as, two year vocational-technical schools, technical junior colleges, trade schools, etc. These schools must be accredited by a recognized accrediting agency and must offer courses which directly relate to the trade of the applicant desiring credit through competency tests at Kearney State College.

RECOGNIZED WORK EXPERIENCE

Full-time and/or part-time employment, accumulated by a candidate for a degree in occupational education.

SPECIALIZED AREA

A division or part of an occupational area (example: Foundry as a part of Metalworking)

TECHNICAL COMPETENCIES

Competencies which a qualified T & I instructor should possess in order to teach the manipulative skills and informational topics associated with a particular occupational area

TRADE AND INDUSTRIAL EDUCATION

A phase of vocational education of less than college grade, suited to the needs of prospective and actual workers in the fields of manufacturing, industry, and trades (Good's Dictionary of Education, 1959).

VOCATIONAL-TECHNICAL EDUCATION

Training intended to prepare the student to earn a living in an occupation in which success is dependent largely upon technical competency and an understanding of the laws of science and technology as applied to modern design, production, distribution, and service. (AVA "Definition of Terms").

PART II DEVELOPMENT OF THE STUDY

Review of the Literature

Preliminary Procedures for Conducting the Study

Development of the Model Plan

Establishment of the Occupational Areas
Sub-Division of the Occupational Area
Analysis of the Specialized Area
Compilation of the Competency Lists
Revision of the Evaluated Competency Lists
Development of the Model Test
Development of the Format for Granting Credit

REVIEW OF THE LITERATURE

After an extensive review of the literature, it is apparent that little has been done to establish a model plan for granting college-university credit for trade and industrial experience.

A number of schools across the United States have adopted policies and procedures by which they evaluate a person's occupational competencies; but, in most cases, these policies and procedures are not written so that each individual applying for credit can expect to be evaluated by the same methods and criteria as others applying for the same credit.

In 1966, Lauda made a study of the factors related to the granting of college-university credit for work experience. He used a questionnaire to identify each college and university in the United States and Puerto Rico which had such a program as part of its curriculum and to determine the minimum standards and methods of evaluation used by these institutions in granting this type of credit.

Lauda concluded from his findings that:

1. Of 201 institutions in the United States and Puerto Rico, 49 do grant college or university credit for trade and industrial experience.

2. Of the 152 respondents who do not grant such credit, 39 said they plan to do so in the future.

3. The policy of granting such credit has been in practice since 1920, and the greatest number of institutions beginning this practice appeared during 1948 and 1950.

4. Most institutions who grant such credit do so to fewer than 10 applicants per year.

5. The large majority of institutions granting such credit have a set number of hours that must be satisfactorily completed before credit can be granted. One-half indicated that credit would be granted when the candidate has earned 39 semester hours.

6. The vast majority of institutions granting credit indicated that the applicant must meet all entrance requirements in the college catalog before credit would be granted.

7. The majority of the institutions which offer credit allow from 10 to 29 semester hours to be acquired in this manner.

8. 40.5 per cent of the crediting insitutions require the candidate to have the approval of the State Department of Vocational Education before his work experience can be evaluated.

9. 37 per cent of the institutions require that the applicant complete a teacher training program before he can be evaluated.

10. 12 per cent of the institutions require that the applicant have some teaching experience.

11. 21 per cent of the institutions require that the applicant must have served an apprenticeship.

12. 60 per cent require that previous employers submit recommendations to the institutions.

13. There are three basic types of examinations used by the majority of the institutions: (1) written, (2) skill, and (3) oral.

14. 65 per cent of the institutions developed their own written examination and 75 per cent developed their own skill exam. Other means used to develop the exams were through the state department and industry; one institution reported that it uses a national exam.

15. The majority of the institutions use two to four hours for written exams, two to four hours for skill exams, and one to three hours for oral exams.

16. The people who made up the testing committee were from business, industry, the institution, state department, and various other sources.

17. Six different grading systems were used. All of the reporting institutions used 70 to 75 per cent as a minimum score.

18. If the applicant failed the first exam, 50 per cent would allow a re-test at a later date.

19. 100 per cent of the institutions charge fees for administering the exams.

A recent study, done by Kazanas and Kieft (1966) while at Eastern Michigan University, identified thirteen states across the country which

currently conduct competency examinations. These states were California, Kansas, Colorado, Massachusetts, New York, Oregon, Pennsylvania, South Carolina, Louisiana, Texas, Wisconsin, and Michigan, plus the District of Columbia. This study was primarily concerned with determining more effective ways in which vocational teachers can be certified in the State of Michigan. The development of competency examinations for use in certification was of prime importance. Several important conclusions were developed from this study:

1. Well-designed competency examinations play an important role in teacher certification programs.
2. Examinations can be effective in determining the technical knowledge of a vocational teacher.
3. Examinations are one means of increasing the number of vocational teachers.
4. Examinations can indicate weaknesses in persons who fail in the vocational teaching field.
5. Examinations can be used to help improve the qualities of vocational teachers.

O'Brian and Schaefer (1966) wrote a paper partially concerned with trade and industrial teacher competencies as a part of the 1966 Report of a National Invitational Research Planning Conference on Trade and Industrial Teacher Education held at the Ohio State University. A review of research done in this area was the major point of concern. Abstracts of studies done by Walsh (1960), Moeller (1961), and Reese (1954) were included in this report. The most pertinent of these studies have been ordered but were not available at the time of the writing of this review.

A study just completed by Glenn and Stone (1969) pointed out that a number of institutions are presently granting credit for non-credit voca-

tional post-high school courses. There was further evidence in this study which pointed to the justification of allowing college credit for work experience and credit for knowledge and skills demonstrated through use of competency tests.

A booklet produced by the Department of Industrial Education at Oregon State University (1969) seemed to be the most organized piece of work pertaining to policies and procedures followed in granting credit for occupational competence and industrial work experience.

The booklet indicated:

1. How an applicant can obtain credit for trade experience.
2. The provisions for credit through competency examinations.
3. The administrative procedures for the written, manipulative, and oral parts of the competency examinations.
4. The function of the evaluation committee.
5. The cost of the competency examinations.
6. The style used for various application forms.

Several letters were received from industrial education departments across the country which presented certain policies and procedures that are currently being followed to establish a criteria for evaluation of work experience.

The Ohio State University, in cooperation with the Ohio State Department of Education, has produced a manual which is designed to help in the construction of occupational competency tests. It deals with the analysis of the occupation in which the test is to be developed. Both written and performance tests are discussed. A thorough discussion is made of the procedures used to evaluate the test results. The booklet is

quite comprehensive and should be of value as a guideline in producing competency tests.

A program (COPE) is currently being conducted by the Department of Vocational-Technical Education of Rutgers--the State University of New Jersey. A student may pursue a program in one of the recognized trade or industrial areas. Once he has completed the specified cooperative work experience, he is eligible to take an occupational competency examination. If he successfully passes both the written and practical parts of this test, he receives 12 college credits.

Several studies listed in the bibliography attempted to identify the general professional teaching competencies of trade and industrial teachers, but very little has been done to identify the occupational competencies needed by instructors in specific areas of T and I.

Letters were recently received during the correspondence with teacher educators which indicate that some work is being done in the development of competency tests. Dr. Jerald Griess at the Eastern Michigan University if presently validating tests in seven occupational areas, and Dr. Thomas Olivo has recently been named as project director of a program designed possibly to establish a competency testing program on a national basis.

PRELIMINARY PROCEDURES FOR CONDUCTING THE STUDY

During the review of the literature, the writer made note of people who had written material concerning occupational competency and the granting of college-university credit for work experience. Letters were sent to selected people identified during this review. The prime questions which were asked in these letters were, "Are there materials available concerning the identification of technical competencies required of instructors in the various areas of trade and industry?" and "What information do you have concerning the acquisition or production of written tests to evaluate the technical competencies of trade and industrial instructors?"

The replies to these letters did not produce significant material concerning the problem. The majority of the respondents either demonstrated a desire to know more about the development of the Kearney State Project and regretted not being able to supply information, or in some cases politely chose not to give out tests which had been developed by their institutions. Reasons for this choice were varying and quite understandable.

Any material which was found to be of importance in satisfying the objectives of this study was filed and used later to produce the basic outline for the model plan.

Through correspondence with Mr. Robert Hanson, instructor at Purdue University, it was learned that a study had been conducted which listed institutions which grant credit for demonstrated trade competence. These schools are:

1. Arizona State College
2. California State College
3. Colorado State University
4. Connecticut Teachers College
5. Eastern Michigan University
6. Florida State University
7. Idaho State College
8. Louisiana State University
9. Louisiana A & M
10. University of Maryland
11. Massachusetts State Teachers College
12. Highlands University - N. M.
13. Eastern New Mexico College
14. University of the State of New York
15. University of Akron
16. University of Cincinnati
17. University of Toledo
18. University of Pittsburgh
19. Clemson
20. Oregon State College
21. Texas A & M
22. Utah State Agricultural College
23. Stout Institute
24. University of Wyoming
25. University of Kentucky
26. Purdue University
27. Indiana State University
28. Iowa State University

A letter was mailed to the department heads of industrial education at each of these schools asking, "What are the methods and procedures by which you evaluate a student's work experience, and by what criteria do you arrive at a set number of hours toward a degree?"

Several answers to these letters ultimately helped to establish the basis for the format used to evaluate applicants who will take the occupational competency test for credit toward the B.S. degree in occupational education at Kearney State College.

A study done by Kazanas and Kieft (1966) while at Eastern Michigan University, identified the following state departments of education which gave competency tests to their trade and industrial teachers: Colorado

Kansas, Louisiana, Massachusetts, Michigan, Oregon, Pennsylvania, Wisconsin, California, New York, South Carolina, and Texas, plus the District of Columbia. Letters were written to the directors of vocational education at these state departments, and information concerning tests or actual copies of the test used in their testing program were requested. At this time, only the State of Oregon has sent any information of significant value to the project. This information is in the form of a written test for the area of machine shop.

DEVELOPMENT OF THE MODEL PLAN

After the review of the literature was conducted and all data pertaining to the study had been analyzed, the writer felt that in order to establish a model plan for granting college-university credit, there was a need to:

1. Establish the various occupational areas to be included.
2. Sub-divide a selected occupational area into specialized areas.
3. Conduct an analysis of the content of one of the specialized areas to determine the knowledge and skills needed to function as a competent T and I instructor.
4. Compile a list of the competencies needed by a T and I instructor to function effectively in the specialized area, and subject this list to an extensive evaluation. (The list of competencies will be derived from the analysis of the content of the specialized areas.)
5. Review the evaluated list of competencies and formulate a final list.
6. Develop a model test for the selected specialized area, based upon the final list of technical competencies.
7. Develop a standard format or system by which each person who applied for college-university credit would receive fair evaluation and a justifiable amount of credit for occupational work experience.

The following plan was developed, according to the preceding list of established needs:

ESTABLISHMENT OF THE OCCUPATIONAL AREAS

1. In establishing the various occupational areas to be included in the model plan for granting college-university credit for trade and industrial experience, several considerations were made and various sources of reference were consulted.

The Trades and Industrial occupations section of the Office of Education, Standard Terminology for Instruction (1970) lists the following thirty-six major occupations:

Air Conditioning
*Appliance Repair
*Automotive Industries
Aviation Occupations
*Blueprint Reading
Business Machine Maintenance
Commercial Arts Occupations
Commercial Fishery Occupations
*Commercial Photography Occupations
*Construction and Maintenance Trades
Custodial Services
*Diesel Mechanic
*Drafting Occupations
*Electrical Occupations
*Electronics Occupations
Fabric Maintenance Services
Foremanship, Supervision, and Management Development
*Graphic Arts Occupations
Industrial Atomic Energy Occupations
Industrial Maintenance and Repairs Occupations
Maritime Occupations
*Metalworking Occupations
*Metallurgy Occupations
Nucleonic Occupations
Personal Services
*Plastics Occupations
Public Service Occupations
Quantity Food Occupations
Refrigeration
*Small Engine Repair (Internal Combustion)
*Stationary Energy Sources Occupations
Textile Production and Fabrication
Shoe Manufacturing and Repair
*Upholstering
*Woodworking Occupations
Other Trades and Industrial Occupations

It must be remembered that these are major divisions and that each one of these divisions is sub-divided into many more technical divisions.

After an analysis of this list, the occupations which seemed to represent those found in Nebraska and those which seemed to be complementary to the curriculum and facilities of the Industrial Education Department at Kearney State College were selected as areas which would be considered for development in the initial program. (Those selected are identified by an asterisk.)

The Dictionary of Occupational Titles Vol. II--Occupational Classification was analyzed to determine the occupational areas listed which might help establish the criterial mentioned in the preceding paragraph. The following twelve occupational classifications were identified and selected.

Occupations in Architecture and Engineering
Occupations in Processing of Metal
Metal Machining Occupations
Metalworking Occupations
Mechanics and Machinery Repairmen
Printing Occupations
Wood Machining Occupations
Occupations in Metal Fabricating
Welders, Flame Cutters, and Related Occupations
Electrical Assembling, Installing, and Repairing Occupations
Construction Occupations
Occupations in Graphic Art Work

Following considerable discussion and analysis of the various occupational areas which might be incorporated in the program at Kearney, the industrial education staff agreed that with respect to facilities, staff, and various other considerations, the following occupational areas would be included in the initial program. These general occupational areas would be the ones which would ultimately be divided into specialized areas, and competency tests would be developed to cover the content of each one.

Building Trades and Woodworking Occupations
Drafting Occupations
Electricity-Electronic Occupations
Metalworking Occupations
Power Occupations
Graphic Arts Occupations
Industrial Plastics Occupations

SUB-DIVISION OF THE OCCUPATIONAL AREA

2. When identification of the seven major occupational areas was completed, metalworking was selected as the area to be sub-divided into specialized areas.

Several current textbooks and technical handbooks were analyzed during the sub-division of the specialized areas of metalworking. Teacher educators were consulted concerning this problem. Test titles used by other institutions were reviewed according to the content which they

indicated, and letters received during correspondence involved with the project were reviewed.

Following this analysis, the list of seven specialized areas for the occupational area of metalworking was selected.

Machining	Sheet Metal
Welding	Metal Fabrication, Assembly, and Finishings
Foundry	
Hot and Cold Forming	Metallurgy

ANALYSIS OF THE SPECIALIZED AREA

3. After identifying the seven specialized areas of metalworking, the specialized area of machining was chosen as the area to be analyzed for content in order to determine the knowledge and skills needed to function as a competent T and I instructor in this specific area.

A number of recognized sources of reference were used in the analysis of the specialized area of machining. The references appear in the bibliography pertaining specifically to metals.

During this analysis, it became apparent that there was a need to establish a separate specialized area related to the occupational area of metalworking. This area would deal entirely with measuring, gaging, and layout work. It would overlap into all specialized areas of metalworking as well as into other identified occupational areas. It was felt that when competency tests were developed for this area of measuring, gaging, and layout, they could be used as a supplemental test for all of the specialized areas of metalworking and, with some revision, could possibly be incorporated into tests of some of the other specialized areas identified in occupational areas other than metalworking.

COMPILATION OF THE COMPETENCY LISTS

4. A list of twenty-one different competencies needed by a T and I instructor in the specialized area of measuring, gaging, and

layout work were identified. One hundred and forty were identified from the analysis of the area of machining.

The identified competencies were written as behavioral objectives. Directions for the evaluation of these competencies by teacher educators, trade and industrial teachers, and journeymen of the trade in industry were written, and a complete instrument was formulated and mailed to these people asking for changes in wording, deletions, additions, and comments.

At this point, it should be mentioned that the evaluation of competencies by trade and industrial instructors should be conducted during the regular academic year. During the summer months, most of these instructors are not available to make the evaluation.

REVISION OF THE EVALUATED COMPETENCY LISTS

5. When the competency list had been returned by teacher educators, trade and industrial instructors, and journeymen of the trade in industry, they were extensively reviewed.

The review of the returned lists of competencies indicated that several revisions needed to be made.

One industrial plant manager had improved and added to the evaluation procedure by breaking the lists of competencies down into the two categories: (A) Working knowledge: Theoretical and technical background plus ability to set-up, operate, and/or demonstrate, and (B) Theoretical knowledge: Being aware of tool application, procedure, etc. He further broke this down by rating the competencies in these categories according to (1) most important, (2) less important, and (3) least important. This evaluation proved to be quite complete and will be incorporated in the evaluation of all competency lists in the future. This type of rating will also provide

grounds for the number of questions to be developed for each competency when competency tests are developed.

The final lists of competencies were the product of this evaluation. They will be used as a basis for developing the competency tests in the specialized areas of measuring, gaging, and machining, and layout.

DEVELOPMENT OF THE MODEL TEST

6. After the evaluated lists of competencies had been formulated, a model written occupational competency test was developed.

According to the primary source of information used in the development of the model written occupational competency test, tests of this type should be constructed with reference to the following list of considerations. (Ohio Trade and Industrial Education Service, 1962). These considerations also apply to manipulative and oral tests.

1. An occupational analysis should be performed in order to determine the skills and technical knowledge needed in the particular occupation for which the test is being prepared.

2. The basic skills and knowledges should be selected for use in test construction.

3. Enough questions should be provided to sample all phases in the occupation.

4. The application of mathematics, science, safety, and other technical knowledge pertinent to the occupation should be included.

5. When choosing the manipulative processes to be tested, enough basic skills should be selected in order to provide situations which will show mastery of the occupation.

6. No uniform time allowance should be set for all examinations.

7. Suggested time should be one-half day for the technical test and a full day for the manipulative test.

8. The total test time should be determined according to the performance of one or more competent individuals.

9. At least two questions should be prepared for each competency identified.

10. A wide variety of types of questions should be used to provide the examinee with an opportunity for varied forms of responses.

11. One or more persons, other than the person developing the test, should read the questions as a check against possible errors, misinterpretations, or ambiguity.

12. A clean-cut, well-organized, and neat format for the examination should be used.

13. An experimental tryout should be made with a small group of qualified individuals.

14. An item analysis should be made after the experimental tryout.

15. Performance test assignments which can be evaluated objectively by a competent and unbiased examiner should be selected.

The written test which was developed does not appear in this report, but information concerning this test can be secured by contacting the project director. This test represents a model which was developed as a guideline or format to be used in the construction of similar tests for the remainder of the identified specialized areas. Two questions were developed for each competency on the final competency test. It has not been subjected to an evaluation by a group of qualified individuals and, therefore, has not been fully evaluated. It is planned that this phase of the pilot test development program will be conducted during the 1969-70 academic year at Kearney State College. Further research will be conducted which relates to competency test validation and the establishment of test standards.

DEVELOPMENT OF THE FORMAT FOR GRANTING CREDIT

7. A standard format or system for justifiably granting college-university credit for occupational experience was developed.

> This phase of the project was completed after considerable consultation with members of the Kearney Industrial Education staff and a review of the correspondence from teacher educators across the country who were associated with programs which incorporated this type of policy into the curriculum of their department.

The initial step was taken in the development of the Conversion Format for Granting College Credit for Competence Gained Through Experience when letters were written to twenty-five industrial education department heads across the country. The programs of these people had been identified as ones which currently granted credit for occupational work experience, and the basic questions which were asked were, "What are the methods and procedures by which you evaluate a student's work experience and by what criteria do you arrive at a set number of hours toward a degree?"*

An extensive review was made of these letters and of various other sources of reference; such as, the study done by Lauda (1966). A preliminary draft of the format was made and presented to members of the Kearney State College Industrial Education staff for review and revision. The final "conversion format" was then developed.

This format has not undergone extensive evaluation and has not been subjected to use in any established program. It is considered an initial step in the development of an instrument which will help in the justifiable granting of college-credit for occupational work experience.

*The identification of these departments was made from information received in a letter from Mr. Robert Hanson at Purdue University.

PART III SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Conclusions

Recommendations

SUMMARY

The primary purpose of this study was to develop a model plan for granting college-university credit for trade and industrial occupational experience. Selection and/or preliminary development of competency tests were of prime importance; and the development of a method for the identification of the competencies needed by instructors in specific occupational areas was given special consideration.

A review of the literature was made, and several interesting observations were made. There are several schools which are presently granting college-university credit for occupational work experience, but very few of these schools have developed a standard format of methods and procedures by which they evaluate a student's work experience. The criteria by which they arrive at a set number of hours toward a degree are quite flexible.

The procedure used to gather information pertinent to the project was to interview and/or correspond with teacher educators, state department officials, and instructors in vocational-technical schools. Materials that were relevant to the project were identified and, in some cases, purchased for use in further development of this project.

CONCLUSIONS

When the initial steps were taken to study the problems involved in granting college-university credit for work experience, the general hypothesis was made that difficulty would be encountered in finding prepared competency tests which would fit the situation at Kearney State College. After the search for these tests has been made, this hypothesis has become more evident. The institutions which have developed tests are reluctant to provide outside sources with copies of their tests. Several other institutions have stated that the tests which they use are outdated and need revisions.

If any institution is to offer college credit for work experience, valid competency tests must be developed. The success in granting the B.S. degree in Occupational Education at Kearney State College depends to a large extent upon the development of these tests and the impartial methods used in granting credit.

RECOMMENDATIONS

Several recommendations for further research and development have emerged from this study.

1. Because there are few, if any, sources of written occupational competency tests which fit the particular situations found at Kearney State College and in the State of Nebraska, there is a great need for further development of tests to meet these needs. Without these tests, it will be impossible to justify the granting of college-university credit for occupational work experience.

2. The development of occupational competency tests should follow an organized plan to insure uniformity and validity. This type of development takes money and the time of personnel skilled in the techniques of test development and knowledge of the occupational areas to be included in the testing program. This type of project can not be undertaken by a staff of college industrial education instructors as an addition to their existing load of teaching responsibilities.

3. If the remainder of the competency testing program is to be developed, it should be undertaken by at least two full-time project workers.

4. Consideration should be given to the possibility of establishing a State Testing Agency which would administer written, manipulative, and oral trade competency examinations.

5. If a National Competency Testing Center is organized, it would be advisable to consider using its services.

Specific recommendations for further development of the technical competency lists and tests:

1. The most current materials available should be used in the analysis of the specialized areas.

2. When the lists of technical competencies for the specialized areas have been identified, these procedures of evaluation should be followed:

   a. Each list should be analyzed by a teacher educator who has in-depth knowledge of the specialized area.

   b. Each list should be analyzed by an instructor from a voca-

tional-technical school. This instructor should have in-depth knowledge of the specialized area.

c. Each list should be analyzed and evaluated by the established procedures by at least two journeymen possessing in-depth knowledge of the specialized area.

3. Development of technical competency test questions should be based entirely upon the identified technical competencies. The procedure to be followed in this development are found in a booklet, printed by the Ohio State Department of Education, titled, "Occupational Competency Tests, Procedures, and Instructions for Construction or Revisions."

4. Course outlines should be developed for each of the specialized areas in each occupational area. These course outlines should be based upon the technical competency lists that will be developed for each specialized area. Established methods and procedures of vocational education course construction should be used, and the resultant course outlines should be incorporated into a curriculum guide for the occupational education program at Kearney State College.

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